



U.S. ARMY COMBAT READINESS/SAFETY CENTER

ARMY SAFE
IS ARMY STRONG



Motor Pool and Maintenance

Safety and Accident
Prevention

Maintenance-Related Accidents

Maintenance-related accidents are responsible for 20 percent of all military on-duty injuries



References

- 29 Code of Federal Regulations (CFR) 1910, *General Industry Standards*
- AR 385-10, *The Army Safety Program*
- AR 750-1, *Army Material Maintenance Policy*
- DA Pam 750-1, *Commanders' Maintenance Handbook*
- DA Pam 750-3, *Soldiers' Guide for Field Maintenance Operations*

Terminal Learning Objective

Action:

Explain requirements for motor pool and maintenance safety and accident prevention.

Conditions:

During group discussions regarding motor pool and maintenance operations.

Standard:

Requirements include responsibilities, standing operating procedures, and safety precautions.

Lesson Data

- Safety Requirements
- Risk Assessment
- Environmental Conditions
- Evaluation
 - Oral questions
 - Participation during class discussions

Overview

- Responsibilities of key maintenance personnel
- Standing Operating Procedures (SOPs)
- Precautions for hazards found within or around a motor pool and/or maintenance facility
- Hazards of specialized equipment and procedures

Enabling Learning Objective A

Action:

Identify the responsibilities of key maintenance personnel within a unit maintenance program.

Conditions:

Given the titles of key maintenance personnel

Standard:

Identification must include a minimum of three responsibilities for each as outlined in AR 385-10, AR-750-1, and DA Pam 750-1.

Commander's Responsibilities

- As an Army leader, commander's responsibilities include:
 - Protecting personnel, equipment, and facilities
 - Establishing accountability for safety and occupational health
 - Implementing safety and occupational health policies

Commander's Responsibilities

Continued

- Commander's responsibilities also include:
 - Integrating Composite Risk Management (CRM) process into mission activities
 - Emphasizing the importance of safety and maintenance

Safety Officer/NCO Responsibilities

- Responsibilities include:
 - Serving as principal advisor to the commander in all safety / occupational health related matters related to mission
 - Advising and assisting the commander in ensuring CRM is an integral part of the unit's operations and training
 - Assisting with hazard identification and assessment tools

Supervisor's Responsibilities

- A supervisor's responsibilities include:
 - Maintaining a safe and healthful workplace
 - Inspecting the work area for hazards
 - Using CRM during planning, preparation, and execution of all operations
 - Preventing accidents

Supervisor's Responsibilities

Continued

- A supervisor's responsibilities also include:
 - Attending, leading, and supervising preventive maintenance operations
 - Checking and updating SOPs
 - Enforcing Army Maintenance Standards
 - Training operators and crews to operate equipment and perform PMCS properly
 - Enforcing safety

Operators' and Crews' Responsibilities

- Operator and crew responsibilities include:
 - Detecting and reporting malfunctions
 - Operating equipment properly and safely
 - Knowing their responsibility in achieving the Army Maintenance Standard
 - Performing Preventive Maintenance Checks and Services (PMCS)

Performing PMCS

- Cornerstone of the Army Maintenance System
- Required by all printed, electronic, and interactive electronic technical manuals (TM)
- Must be performed from the applicable TM
- Faults detected that violate a safety directive must be corrected

Enabling Learning Objective B

Action:

Describe the requirements for maintenance standing operating procedures (SOPs).

Conditions:

During group discussions.

Standard:

Requirements must include the description for the need of SOPs and at least 10 areas that should be addressed in detail as specified in DA Pam 750-3.

Why have a Maintenance Standing Operating Procedure (SOP)?

- Required by AR 750-1 which states:
 - “SOPs will be established and maintained by all Army organizations and activities performing maintenance operations.”
- Purpose
 - To formally describe the way a unit performs maintenance

Motor Pool and Shop Safety SOPs

- DA Pam 750-3 specifies
 - Every unit SOP will address safety
 - Motor pool operations and field maintenance are linked with safety

Minimum Areas to Address in SOP

- Duties/responsibilities for key unit personnel
- How the maintenance platoon is organized
- The Army Maintenance Management System (TAMMS) information not covered in DA Pam 750-8

Minimum Areas to Address in SOP

*Continu
ed*

- Preventive maintenance checks and services (PMCS)
 - Procedures for scheduled Field PMCS
 - Army Oil Analysis Program (AOAP)
 - Calibration of tools and Test, Measurement, and Diagnostic Equipment (TMDE)

Minimum Areas to Address in SOP

Continued

- Tool accountability and control procedures
- Safety requirements to include:
 - All applicable safety guidance associated with equipment maintenance
 - HAZMAT and PPE
 - Lifting and holding device servicing
 - Chemical Agent Resistant Coating (CARC)

Minimum Areas to Address in SOP

Continued

- Unit maintenance training programs and requirements
- Motor pool security
- Readiness reporting
- Publications
- Work order management

Minimum Areas to Address in SOP

***Continu
ed***

- Equipment classifications
- Battlefield damage assessment and repair/recovery (BDAR/R)
- Repair parts (Class IX) management
- Warranty Management Program

Minimum Areas to Address in SOP

Continued

- Army Record Information Management System (ARIMS) filing system
- Equipment winterization/extreme climate program

SOP Development Considerations

- Maintenance Operations
- Safety and protection plans such as:
 - Fire Prevention Plan
 - Ground Pre-accident Plan
- Past accidents
 - Lessons learned
 - Preventive measures



Motor Pool and Shop Safety Sample SOPs

- Army Knowledge Online (AKO)
- U.S. Army Combat Readiness/Safety Center

Enabling Learning Objective C

- Action: Recommend precautions for hazards found within or around a motor pool and/or maintenance facility.
- Condition: During group discussions and viewing photographs of maintenance areas.
- Standard: Recommended precautions must be feasible and effective.

Recognize Motor Pool and Maintenance Facility Hazards

- Walk around outside areas of the facility to notice:
 - Surface conditions
 - Use of ground guides
 - Use of wheel chocks
 - Protective railings
 - Hazardous substances

Poor Surface Conditions



Ground Guides

- Required when wheeled and tracked vehicles are:
 - Backed
 - Moved within an assembly area or motor pool



Ground Guides

Continued

- Will be properly trained
 - FM 21-60 Visual Signals
 - FM 21-305 Manual for the Wheeled Vehicle Driver
 - TC 21-306, Tracked Combat Vehicle Driver Training



Ground Guides

Continued

- Tracked vehicle movement within an assembly area requires ground guides front and rear



Wheel Chocks

- Army vehicles will be equipped with properly sized chocks when:
 - Vehicles are parked on an incline
 - Maintenance is being performed
 - Vehicle is parked and a trailer is attached

Proper Wheel Chock?





**This is wrong --
why?**

Protective Railings

Elevated platforms (4 feet and above) should be equipped with proper railings and work platforms



Correct OSHA
required platform and
railings

Report this Hazard to be Corrected



Hazardous Substances

Ensure:

- Proper storage, storage containers, and markings
- Inventory listing of all hazardous materials
- Material Safety Data Sheets (MSDS) are located in area
- Signs are posted



Material Safety Data Sheets (MSDS)

- Must be maintained in the work area where hazardous chemicals are stored or used
- Post an inventory list of all chemicals on-hand and MSDS



Know What's Stored



Hazardous
substance?



Secondary
containment needed?

Recognize Motor Pool and Maintenance Facility Hazards

- Walk around inside areas of facility to notice hazards associated with:
 - Roof leaks
 - Exhaust/Carbon Monoxide
 - Bay areas
 - Mezzanine storage areas
 - Noise exposure
 - Electrical
 - Housekeeping and general requirements

Roof Leaks

- May be common, yet still present a multitude of problems
 - Slippery work surfaces
 - Electrical hazards
 - Health hazards
 - Pests



Exhaust / Carbon Monoxide

- Carbon monoxide poisoning may result from exhaust gases
- Avoid operating vehicles in a maintenance facility
- Use ventilation system
- Conduct annual carbon monoxide tests

AR 385-10, 11-
4k



Bay Areas

- Pits must be fully covered when not in use
- An opening can be no larger than one (1) inch



Bay Areas

Continued

- When the cover is not in place
 - Opening must be constantly attended by someone
 - Or be protected by removable standard railings



Mezzanine Storage Areas

- Structure must be approved by a building official
- Post sign showing the load limit and date inspected



Unsafe Overhead Mezzanine



Noise Exposure Surveillance Program

- When noise equals or exceeds an 8-hour time-weighted average of 85 decibels, the employer shall
 - Develop and implement a monitoring program
 - Establish and maintain an audiometric testing program



Electrical



No Cover



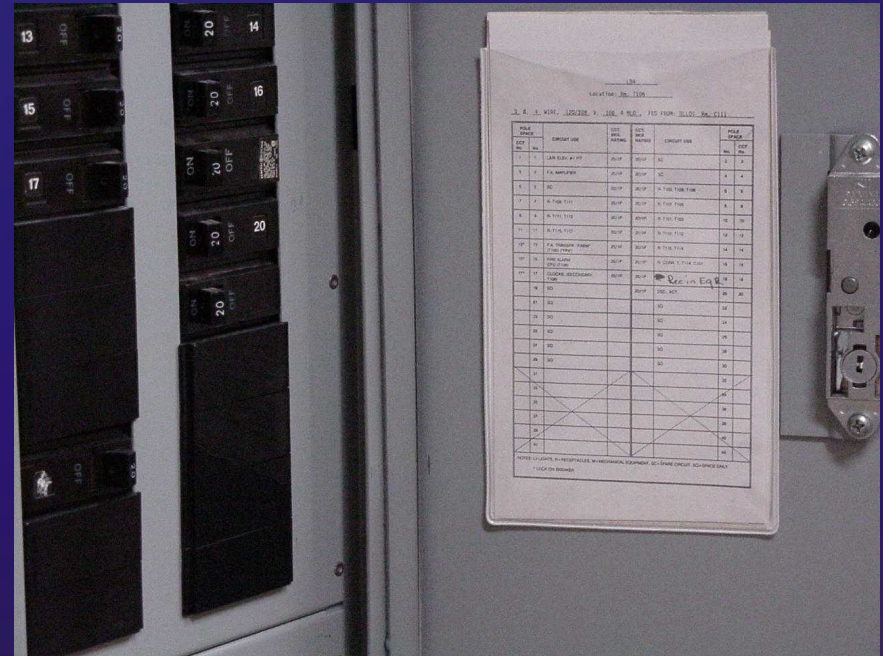
Broken Cover



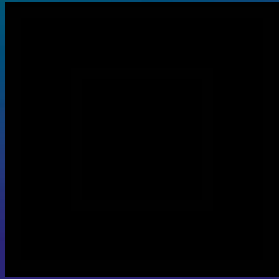
Exposed Wiring

Electrical Panels

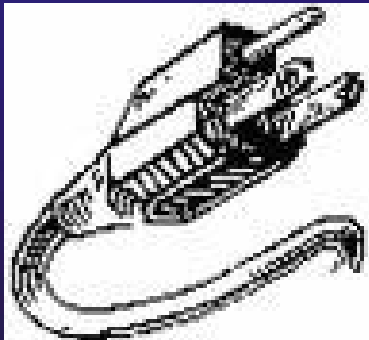
- Each circuit on the panel must be clearly identified and prominently labeled



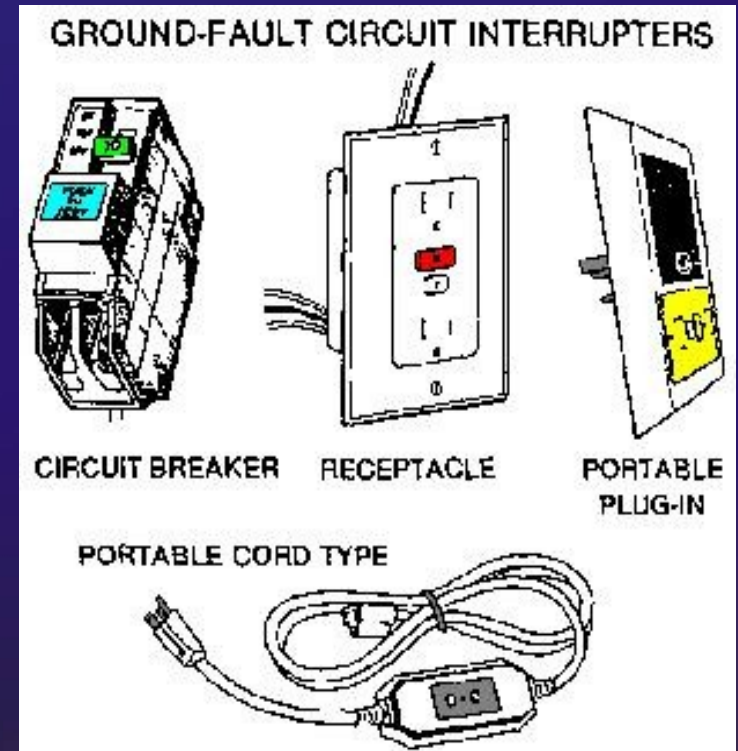
Electrical Ground Protection



Symbol for
double
insulated



Plug with ground
prong



Housekeeping and General Requirements



Violations result in hazards

Exits

Must provide quick, safe egress



Hard to Reach Safety Board



Blocked Emergency Eyewash Station



Blocked Again



Requirements for Emergency Eyewash Stations

- Work areas that may require Emergency Eyewash Stations include:
 - Battery charging areas
 - Spraying operations
 - High dust areas
 - Dipping operations
 - Hazardous substances dispensing areas



Eyewash Stations Accessibility

- Locate as close to the hazard as possible
 - Be on the same floor as the hazard
 - Not separated by a partition from the hazardous area
 - Easily seen by workers
- Ensure path is unobstructed between the workstation and the hazard

Work Surfaces – Water on Floor

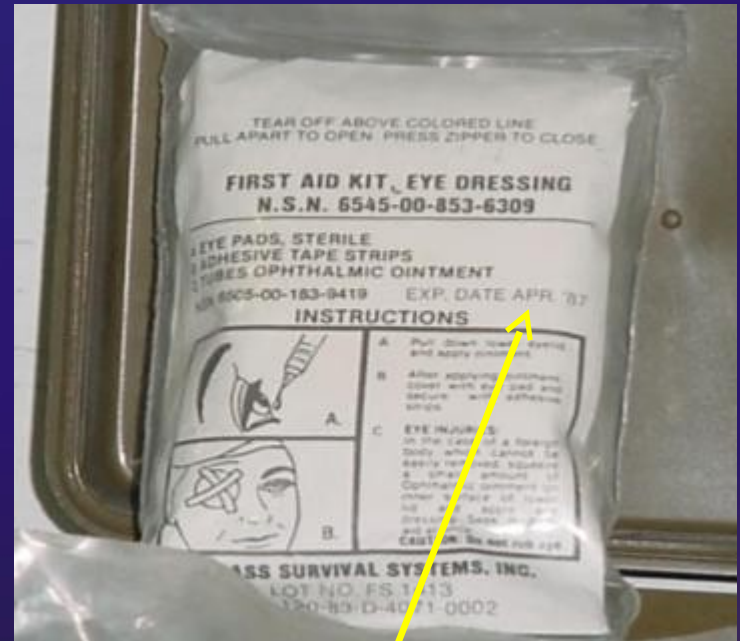


Hazardous

First Aid Kits

Ensure safe for use

- Inspect contents regularly
- Discard outdated items
- Refill kit
 - Complete
 - Current



Check Exp.
Dates

Display Signs

“A picture is worth a thousand words”



Personal Protective Equipment

First-line leaders should be involved in personal protective equipment (PPE) selection for their personnel



Personal Protective Equipment

- When PPE is necessary
- What PPE is necessary
- How to don, remove, adjust, and wear PPE
- The limitations of the PPE
- Proper care, maintenance, useful life and disposal of the PPE

Enabling Learning Objective D

Action:

Identify hazards of specialized equipment and procedures.

Condition:

Given the name and/or photo of equipment or procedure used within maintenance facilities.

Standard:

Recommendations must be provided with hazard identification.

Machine Guarding

- Recognize and control hazards
- Protect from exposure to unguarded or inadequately guarded machines to avoid:
 - Amputations
 - Lacerations
 - Crushing injuries
 - Abrasions
 - Death



Machine Guarding

Continued

- 29 CFR 1910 Requirements
 - When blades of a ventilation fan are less than 7 feet above the floor or working level, the blades will be guarded
- Guard shall have openings no larger than $\frac{1}{2}$ inch opening

Machine Guarding Hazards



Not
Guarded



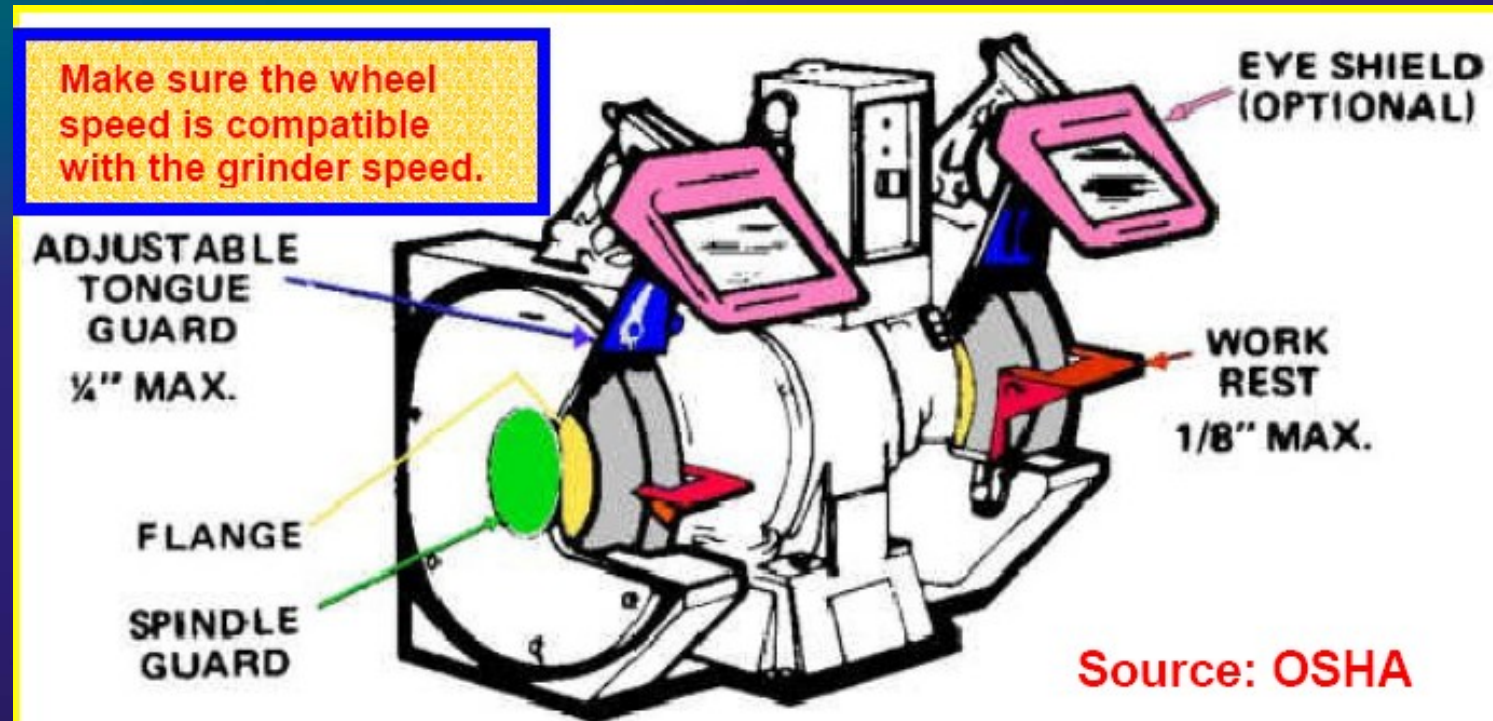
Faulty Guarding

Securing Abrasive Wheel Machines

Must be bolted to a surface area – work bench or floor



Adjusting & Testing Abrasive Wheel Machines



NOTE: Full face shields, hearing protection, and gloves must be used

Air Compressors

- Require scheduled maintenance
 - Drain water to help protect relief valve
 - Avoid dangerous pressure levels
- Locate outside if possible (noise hazard)



Compressed Air

- Air receiver shall be equipped with an indicating pressure gage
 - Do not allow air pressure to exceed 30 pounds per square inch (PSI)
 - 30 PSI is the maximum for cleaning



Compressed Air

Continued

- Use rubber or other insulating material for hose lines to blow out equipment
- Do not use compressed air for cleaning floors
- Do not direct air toward others or self



Lifting Devices

- Reference: TB 43-0142 Safety Inspections and Testing of Lifting Devices
 - Cranes
 - Hoists
 - Slings
 - Trucks, Forklift
 - Jacks and Stands
- Inspect every 6 months



Lifting Devices Load Testing

- Load tests will be clearly marked on the device
- Slings, wire ropes, hooks, etc., used for lifting, must be tagged with due date
- Load rating shall become a part of the maintenance records



Jack Stands and Floor Jacks

- Daily and/or before use inspections
 - Ensure item is safe for use
 - Follow appropriate checklist, technical manual (TM) and other information to ensure safety
- Periodic inspections every 6-months



Fork Lifts

- Train and certify operators
- Do not modify or make attachments
- Examine for defects
- Know the capacity of the truck
- Wear seatbelts
- Ensure reverse alarm works
- Avoid traveling with elevated load

Welding Requirements

- Obtain hot work permit before welding operations
- Area must be deemed safe for welding
- Place shield to protect those passing by the area
- PPE includes gloves, apron boots head shield with protective lens



Welding Operations

- Know what materials are being welded
- Certain metals produce fumes that produce a serious health threat to the welder
- Wear respiratory protection as needed
- No contact lens



Improper Procedures

- Missing PPE for welding
- Lack of fall protection –
No :
 - 3-point stand
 - Guardrail system
 - Guardrail system, or
 - Personal fall arrest system



Compressed Gas Cylinders

- All personnel who work with or handle pressurized gas cylinders will review AR 700-68 annually
- Maintenance activities will maintain a record of these reviews
- Large number of tanks should not be stored in work areas



Compressed Gas Storage

- Storage areas must be clearly marked and properly secured
- Separate cylinders by hazard class
 - Flammable gas
 - Nonflammable gas
 - Poison gas



Cleaning Solvents

- Use approved, environmental safe cleaning solvents
 - Not highly toxic or flammable
 - Consult applicable TM
- Ensure MSDS for solvent used is available
- Wear required PPE



Asbestos and Ceramic Fibers

- Inhaling asbestos and ceramic fibers can cause serious fibrotic lung diseases and lung cancer
- Some brake shoes, clutch linings, and engine gaskets contain asbestos or ceramic fibers
- Take precautions to reduce exposure



Working with Batteries

- Army battery program IAW AR 750-1, Paragraph 8-20
 - Commanders will ensure that all battery shops are operated in an Occupational Safety and Health Organizations/ Environmental Protection Agency compliant manner

Working with Batteries

Continued

- Charge batteries in a well-ventilated, clean, and uncluttered area
 - Wear chemical splash goggles or a full face shield
- Filling Storage Batteries
 - Wear acid-resistant gloves, chemical-splash goggles, rubber aprons, and rubber boots with non-slip soles
 - If available, use a fume hood

Storing Batteries

- Batteries must have secondary containment to prevent acid leaks
- If stored outdoors, they must have overhead cover



Improper
Storage

Lockout - Tagout

- Affixed to energy isolating devices
- Prevent start up or release of stored energy in order to prevent injury to employees
- Prevent activating equipment while it is being worked on



Painting Vehicles

- Minor paint operations can be conducted indoors
- Minor paint operations may be conducted outdoors
- As long as repeated operations is not more often than once a week and no more than one body panel
- Use proper PPE

Tire Cages

- Cages should not be bolted down
- Training and instructions must be provided
- Correct air hose must be used, that is, use a 10-foot extension with clip on ch



NSN 4910-00-441-8685

Does Not Meet Specifications



UNSAFE FOR USE!

Check on Learning

Name a Commander's responsibilities relating to maintenance facilities.

- Protecting personnel, equipment, and facilities
- Implementing safety and occupational health policies
- Integrating the composite risk management process into their mission activities

Check on Learning

What must operators know to have a successful maintenance program?

- Operators must know how to detect and report malfunctions as well as operate equipment properly and safely.

Check on Learning

What is the objective of the Army's PMCS program?

- The objective is the observation of equipment performance and condition.

Check on Learning

Name requirements regarding an open pit?

- It must be covered when not in use, constantly guarded by someone, or guarded by removable rails

Summary

- Responsibilities of key maintenance personnel
- Standing Operating Procedures (SOPs)
- Precautions for hazards found within or around a motor pool and/or maintenance facility
- Hazards of specialized equipment and procedures

Conclusion

Follow the standards!

Protect yourself and others!

Get the job done safely!